

Serial No. 10/699,282
Amendment and Response
Page 2 of 6

IN THE CLAIMS:

1 (Previously Presented). A valve spring retainer, comprising:

a titanium alloy body portion including an opening therethrough for receiving a valve stem, and at least one step disposed about the opening;

a tungsten carbide layer bonded to the titanium alloy on the step to at least in part define a wear resistant spring seat wherein the tungsten carbide layer is surrounded by a titanium alloy lip of the body portion for reducing damage to an outer edge of the tungsten carbide layer during contact by an end of a spring.

2 (Original). The valve spring retainer of claim 1 wherein the at least one step comprises a first step disposed about the opening at a first elevation and a second step disposed about the first step at a second elevation, and wherein a first tungsten carbide layer is bonded to the titanium alloy of the first step to define a first wear resistant spring seat and a second tungsten carbide layer is bonded to the titanium alloy of the second step to define a second wear resistant spring seat.

3 (Canceled).

4 (Original). The valve spring retainer of claim 1 wherein the titanium alloy comprises Ti 17.

5 (Original). The valve spring retainer of claim 4 wherein the tungsten carbide layer is bonded to the titanium alloy of the step via an HVOF coating process.

6 (Original). The valve spring retainer of claim 5 wherein the tungsten carbide layer is formed by HVOF application of Sulzer 5803 tungsten carbide powder.

7 (Previously Presented). A valve spring retainer, comprising:

a titanium alloy body portion including an opening therethrough for receiving a valve stem, and at least one step disposed about the opening;

Serial No. 10/699,282
Amendment and Response
Page 3 of 6

a tungsten carbide layer bonded to the titanium alloy on the step to at least in part define a wear resistant spring seat for engaging an end of a spring, wherein the tungsten carbide layer is applied in an undercut on the step.

8 (Original). The valve spring retainer of claim 7 wherein the tungsten carbide layer has a thickness of at least about 0.001 inches.

9 (Original). The valve spring retainer of claim 8 wherein the thickness of the tungsten carbide layer is at least about 0.004 inches.

10 (Currently Amended). A valve spring retainer assembly incorporating the valve spring retainer of claim 1, the assembly comprising:

at least one valve spring positioned with one end against the wear resistant spring seat of the valve spring retainer ~~of claim 1~~.

11 (Original). A high performance engine, comprising:

at least one valve associated with the valve spring retainer assembly of claim 10.

12 (Previously Presented). A valve spring retainer, comprising:

a body portion having an opening therethrough for receiving a valve stem, the body portion including at least one step disposed about the opening, the step being of a first material;

a coating of a second material bonded to the first material on the step to define, at least in part, a spring seat for engaging an end of a spring;

wherein the second material is more wear resistant than the first material, and the second material is a tungsten carbide material, wherein the second material is applied in an undercut on the step.

Serial No. 10/699,282
Amendment and Response
Page 4 of 6

13 (Original). The valve spring retainer of claim 12 wherein the body portion is formed by a unitary body in combination with a shim member adjacent the unitary body, the shim member in part defines the step.

14 (Original). The valve spring retainer of claim 13 wherein the shim is of the first material and the unitary body is of a third material.

15 (Original). The valve spring retainer of claim 12 wherein the body portion, including the step, is a unitary member of the first material.

16 (Canceled).

17 (Previously Presented). The valve spring retainer of claim 12 wherein a surface defining the undercut is roughened to facilitate bonding with the second material.

18 (Original). The valve spring retainer of claim 12 wherein the second material has a thickness of at least about 0.001 inches.

19 (Original). The valve spring retainer of claim 12 wherein the second material has a thickness of at least about 0.004 inches.

20-26 (Canceled).

27 (Original). A valve spring retainer, comprising:

a body portion having an opening therethrough for receiving a valve stem, the body portion including at least one step disposed about the opening, the step being of a first material;

a coating of a second material bonded to the first material on the step to define, at least in part, a spring seat for engaging an end of a spring;

wherein the second material is more wear resistant than the first material, and the body portion includes a lip that extends around the coating of the second material to reduce damage to an outer edge of the coating of the second material during contact by an end of a spring.

Serial No. 10/699,282
Amendment and Response
Page 5 of 6

28 (Original). The valve spring retainer of claim 27 wherein the second material has a thickness of at least about 0.001 inches.

29 (Original). The valve spring retainer of claim 28 wherein the second material has a thickness of at least about 0.004 inches.

30 (Original). The valve spring retainer of claim 27 wherein the second material is applied in an undercut on the step.

31 (Original). The valve spring retainer of claim 27 wherein a surface defining the undercut is roughened to facilitate bonding with the second material.